

REMARKS

Claims 1-5 were the original claims. Claim 1 has been canceled and the dependency of each of claims 4 and 5 from claim 1 has been eliminated.

Claims 2-4 and claim 5, as it depends from any one of claims 2-3, are rejected as unpatentable over the combination of Thomas, et al., U.S. 6,640,841 in view of Seino, et al., U.S. 6,235,215 and further in view of Missimer, U.S. 3,768,273.

The Examiner refers to column 3, lines 32-41 of Thomas to support his contention of the presence of a three refrigerant mixture of R245fa, R125 and R508A or R508B. But it is not clear from this portion of the Thomas specification if R245fa and R125 are only referred to in the singular or as part of a mixture. Also, there is no specific teaching in Thomas of a mixture of the two refrigerants R245fa and R125 with either R508A or R508B.

The Examiner states that the Thomas three component refrigerant mixture, if it exists, does not comprise R23 and R14. The reference to R23 is not understood since neither of claims 2 or 3 recite this. Also, R23 is inherent as a part of R508A or R508B.

The Examiner relies on Seino to show that it is known to have refrigerants comprising R23 and for Missimer to show that it is known to have a refrigerant comprising R14. From these three references the Examiner concludes that all of the claimed substances (R245fa, R125, R508A or R508B and R14) are well known components of mixed refrigerants and, accordingly, it would have been obvious to one of ordinary skill in the art to have modified the refrigerant of Thomas to include R23 and R14 for the purpose of producing an alternative refrigerant to chlorofluorocarbon refrigerants.

Seino discloses that the oil returning characteristic becomes better by including an additive. The invention of Seino is in increasing the mixing performance of the R134a and R23 and lowering the boiling point of R134a by using R23 to lower the discharge temperature of the compressor. This is not the problem addressed by the subject invention.

According to the novel subject mixture set forth in claims 2 and 3 of the subject application, the durability of the compressor is improved by using R508A or R508B, as compared to

using R23, such as used by Seino. As noted above, R508A and R508B, while containing R23, are different from pure R23. Further, because the specific heat ratio of R508A is low, the discharge temperature of the compressor can be lowered, which results in a decrease in the production of sludge. This is a further advantage of the refrigerant mixture of the invention.

As to Missimer, this does not teach or suggest using R14 in combination with the other refrigerants, as set forth in claims 2 and 3.

Referring to claim 4, which depends from either of claims 2 and 3, and recites n-pentane in the composition, the Examiner further takes the position that while Thomas also lacks disclosure of the refrigerant comprising n-pentane, Seino shows it is known to have a refrigerant that comprises R23 and also comprises n-pentane.

In Seino, the combination of the refrigerant is R134a and R23, and a hydrocarbon. The hydrocarbon is included by 2-30wt% to lower the discharge pressure of the compressor and not to raise it as is accomplished by the refrigerant of claim 2 of this application. In the present invention, a hydrocarbon, such as n-pentane, is included for returning the oil. So the purpose of adding n-pentane to the refrigerant of claim 2 is for a different purpose than in Seino.

The combination of references as made by the Examiner is essentially a hindsight reconstruction of the claimed invention using a selected refrigerant from each reference patent. There is no teaching or suggestion of making a refrigerant of the four components, as set forth in claims 2 and 3, and the further use of n-pentane as set forth in claim 4. Further, even if the teachings of the three patents are combined, the percentage ratios of the components of the refrigerant of the invention of claim 3 are not disclosed. According to the ratio of the composition of claim 3, the discharge temperature of the compressor can be lowered and refrigeration performance of -85°C can be obtained.

It is clear that there is no reasonable basis to make the combination of references made by the Examiner. The cited art does not teach the novel refrigerant of the invention, which adds to the normal functions of the various individual refrigerants the advantageous features of a low burning property upon leakage, and freedom from the possibility of depleting the ozone layer. Accordingly, claims 2-4 are clearly patentable and should be allowed.

Claim 5 also should be allowable since it is directed to the combination of a refrigeration unit that uses the novel refrigerant of the invention.

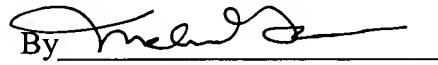
The other art cited has been considered and is not deemed pertinent.

In view of the above, each of the presently pending claims in this application is believed to be in immediate condition for allowance. Accordingly, the Examiner is respectfully requested to pass this application to issue.

Prompt and favorable action is requested.

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Respectfully submitted,

By 

Melvin C. Garner

Registration No.: 26,272
DARBY & DARBY P.C.
P.O. Box 5257
New York, New York 10150-5257
(212) 527-7700
(212) 753-6237 (Fax)
Attorneys/Agents For Applicant